IB796

VIA Apollo PLE133T
Embedded Board

USER'S MANUAL

Version 1.1

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Introduction

Product Description

The IB796 embedded board is a low power platform featuring an integrated VIA Eden/C3 processors. Equipped with four Realtek 8100C 10/100 BaseT Ethernet controllers, this VIA PLE133T-based motherboard delivers excellent levels of scalability and performance on a cost-effective, integrated chipset platform and is designed as an Ethernet firewall/VPN device and for other networking applications.

Featuring LAN-bypass functionality for two ports, The IB796 embedded board is a platform featuring an integrated VIA Eden / C3 processors. Equipped with four Realtek 8100C 10/100 BaseT Ethernet controllers, this VIA PLE133T-based motherboard delivers excellent levels of scalability and performance on a cost-effective, integrated chipset platform and is designed as an Ethernet firewall/VPN device and for other networking applications.

Featuring LAN-bypass functionality for two ports, IB796 allows LAN connection to work continuously even when system faults which is required for certain Internet security applications. With the use of CompactFlash or DiskOnModule on IB796 for installing OS, the system can be free of disruption caused by hard disk drives mechanical failures. One COM port can be used for console monitoring and diagnostics.

The IB796 comes with onboard 64MB/128MB/256MB SDRAM memory. Added expansion is available with the on board miniPCI slot for wireless LAN networking requirements. The board also feature hardware monitoring.

Mounted in an optional aluminum chassis supplied by IBASE, the IB796 Internet security platform powers and handles your mission critical applications with high reliability.

Features
o Supports 300MHz~1GHz VIA Eden (low power) / C3 CPU
o With 4 Realtek 8100C Ethernet controllers
o LAN1-LAN2 bypass function
o On board 64MB/128MB/256MB SDRAM memory
o Integrated VGA with 8MB video memory
o Mini PCI slot, 1 USB, watchdog timer
o Compact Flash socket, 1 COM ports
o 203mm x 146mm

Checklist

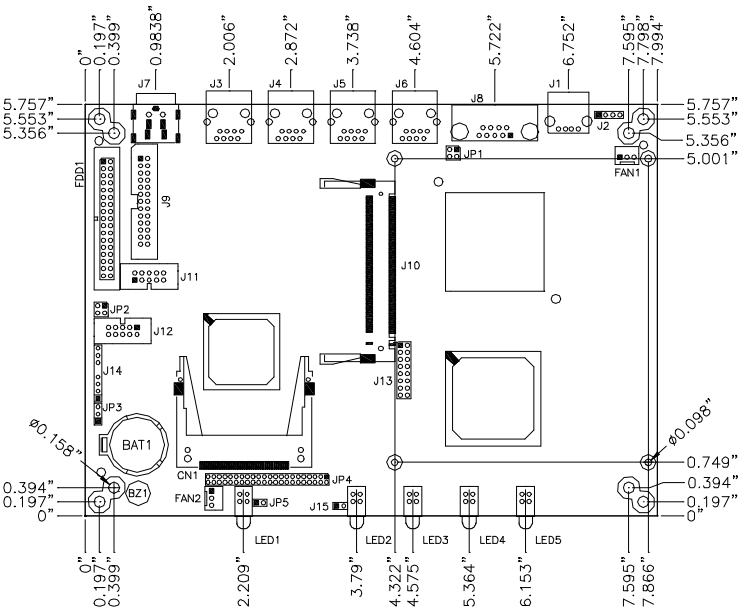
Your board package should include the items listed below.

- The IB796
- This User's Manual
- 1 IDE Ribbon Cable
- 1 Floppy Ribbon Connector
- 1 Y-Cable supporting a PS/2 Keyboard and a PS/2 Mouse
- 1 CD containing the following:
- Chipset Drivers
- Flash Memory Utility

Specifications

Product Name	IB796
Form Factor	5.25-inch Disk-size Embedded Board
CPU Type	VIA Eden / C3 CPU
CPU Voltage	1.05V~1.85V
CPU Speed	300MHz / 1GHz
CPU External Clock	66/100/133Mhz
Chipset	VIA PLE133T+ VT82C686A/B Chipset North Bridge: VT8601T 552-pin PBGA South Bridge: VT82C686A/B 352-pin BGA
BIOS	Award BIOS
Cache	128K/64K Level1/2 (CPU integrated)
Watchdog Timer	32 Level
UART/16550A	COM1: RS232 w/16 Byte FIFO (DB9 Conn)
On Board VGA	VT8601T with Integrated Graphic, Max. 8MB, CRT output (pin header)
LAN * 4	Realtek 8100C 128-pin QFP Single Chip Ethernet Controller. 10/100 BaseT support, four LAN
Memory type	64M/128M/256M on board
SUPER I/O	VIA VT82C686A/B: IrDAx1 Parallel x1, Serial*2, FDC 2.88MB (3 Mode support), Hardware monitor (3 thermal inputs, 4 voltage monitor inputs, VID0-4, 2 fan input (optional)
RTC/CMOS	VT82C686A/B built-in
Battery	Lithium Battery
Keyboard Controller	VT82C686A/B
EPP/ECP	Yes
Local bus IDE (44 pin)	VT82C686A/B built-in, IDE1 (Ultra DMA 33/66/100) IDE1: CF card
USB	1 ports, transfer rate up to 12Mb/s USB1: USB connector
Expansion PCI slot	Mini PCI *1
Ethernet with Bypass Function (LAN 1,2)	Bypass the Ethernet ports when system fault automatically
Board Size	203mm x 146mm

Board Dimensions



Installations

This section provides information on how to use the jumpers and connectors on the board in order to set up a workable system. The topics covered are:

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Setting the Jumpers

Jumpers are used to select various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your needs. The following lists the connectors and their respective functions.

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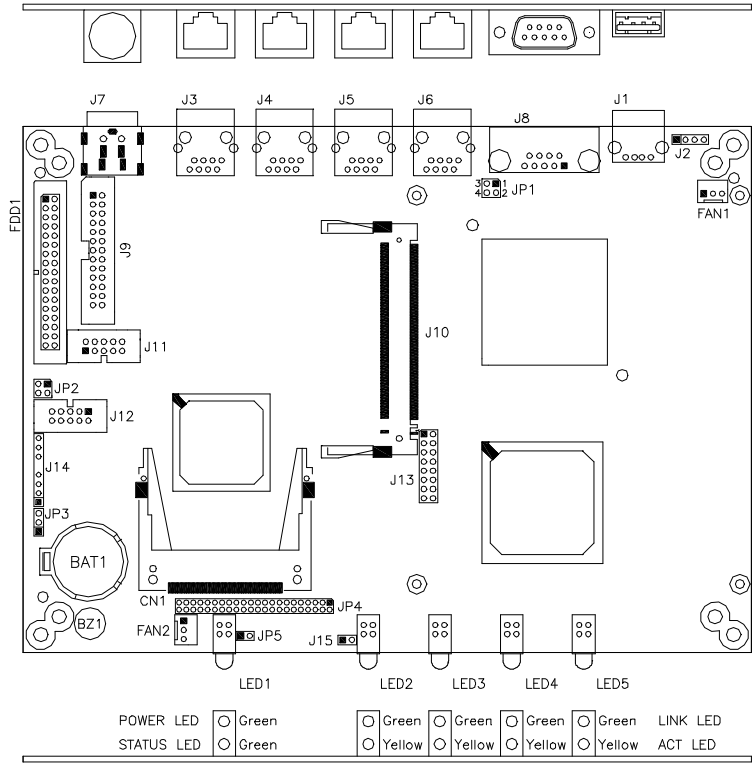
JP3: Clear CMOS Contents..... 8
JP5: CF Card Master / Slave Selection 8

Jumper Locations



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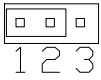
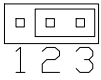
Configuring the CPU Frequency

The board does not provide DIP switches to configure the processor speed (CPU frequency).

JP3: Clear CMOS Contents

Use JP3, a 3-pin header, to clear the CMOS contents.

JP3	Setting	Function
	Pin 1-2 Short/Closed	Normal
	Pin 2-3 Short/Closed	Clear CMOS

JP5: CF Card Master / Slave Selection

JP5	Setting	Function
	Pin 1-2 Short	Master
	Pin 1-2 Open	Slave

Connectors on the IB796

The connectors on the board allow you to connect external devices such as keyboard, floppy disk drives, hard disk drives, printers, etc. The following table lists the connectors and their respective functions.

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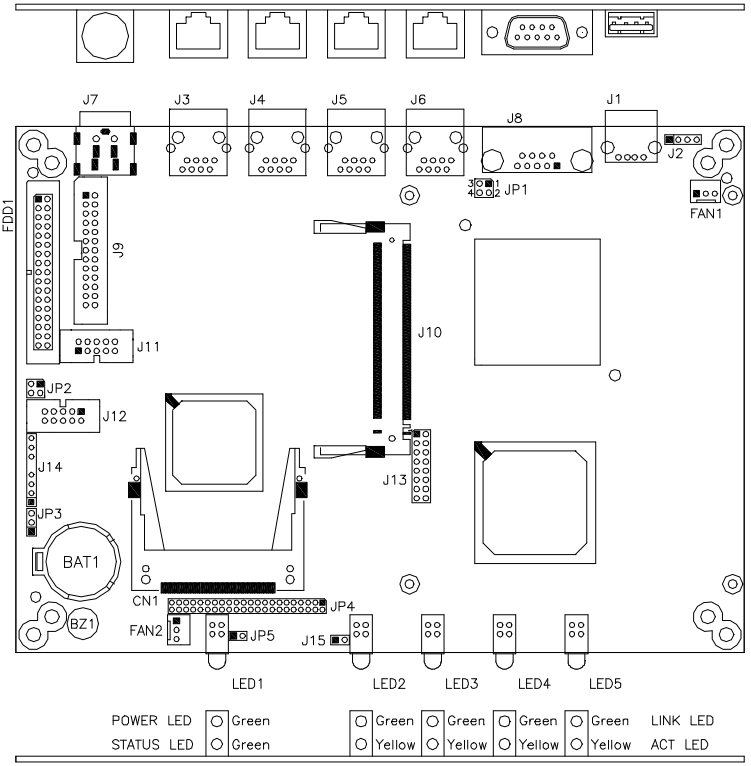
J1: USB Connector 11
J2: External Power Supply Connector 11
J3, J4, J5, J6: RJ45 LAN Connectors 11
J7: Power Connector 11
J8: COM1 Serial Port 11
J9: Parallel Port Connector 12
J10: Mini PCI Connector 13
J11: PS/2 Keyboard and Mouse Connector 12
J13: VGA CRT Connector 14
J14: For Testing Use Only 14
J15: Reset Switch Pin Header 14
CN1: Compact Flash Socket 14
JP4: Primary IDE Connector 15

Connector Locations



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J7: Power Connector 11
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J10: Mini PCI Connector 13
J11: PS/2 Keyboard and Mouse Connector 12
J13: VGA CRT Connector 14
J14: For Testing Use Only 14
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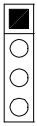
JP4: Primary IDE Connector 15

J1: USB Connector

J1 supports an external USB connector.

Pin #	Signal Name
1	Vcc
2	USB-
3	USB+
4	Ground

J2: External Power Supply Connector

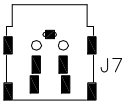


Pin #	Signal Name
1	+5V
2	Ground
3	Ground
4	+12V

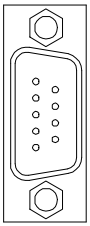
J3, J4, J5, J6: RJ45 LAN Connectors

These four LAN (LAN1/2/3/4) connectors are used in conjunction with the four Realtek RTL8100C Ethernet controllers on the board.

J7: Power Connector (5V only)



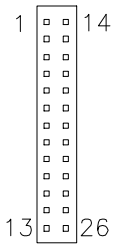
J8: COM1 Serial Port



Pin #	Signal Name
1	DCD, Data carrier detect
2	RXD, Receive data
3	TXD, Transmit data
4	DTR, Data terminal ready
5	Ground
6	DSR, Data set ready
7	RTS, Request to send
8	CTS, Clear to send
9	RI, Ring indicator

J9: Parallel Port Connector

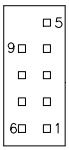
The following table describes the pin out assignments of this connector.



Signal Name	Pin #	Pin #	Signal Name
Line printer strobe	1	14	AutoFeed
PD0, parallel data 0	2	15	Error
PD1, parallel data 1	3	16	Initialize
PD2, parallel data 2	4	17	Select
PD3, parallel data 3	5	18	Ground
PD4, parallel data 4	6	19	Ground
PD5, parallel data 5	7	20	Ground
PD6, parallel data 6	8	21	Ground
PD7, parallel data 7	9	22	Ground
ACK, acknowledge	10	23	Ground
Busy	11	24	Ground
Paper empty	12	25	Ground
Select	13	N/A	N/A

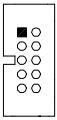
J11: PS/2 Keyboard and Mouse Connector

J11, a 10-pin header connector, has functions for both keyboard and mouse.



Pin #	Signal Name	Pin #	Signal Name
10	N.C.	5	N.C.
9	KB clock	4	Mouse clock
8	KB data	3	Mouse data
7	Vcc	2	Vcc
6	Ground	1	Ground

J12: COM2 Serial Port



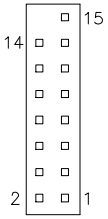
Pin #	Signal Name
1	DCD, Data carrier detect
2	RXD, Receive data
3	TXD, Transmit data
4	DTR, Data terminal ready
5	Ground
6	DSR, Data set ready
7	RTS, Request to send
8	CTS, Clear to send
9	RI, Ring indicator

J10: Mini PCI Connector

Pin #	Signal	Pin #	Signal	Pin #	Signal	Pin #	Signal
1	NC	2	NC	63	+3.3V	64	FRAME#
3	NC	4	NC	65	CLKRUN#	66	TRDY#
5	NC	6	NC	67	SERR#	68	STOP#
7	NC	8	NC	69	Gnd	70	+3.3V
9	NC	10	NC	71	PERR#	72	DEVSEL#
11	NC	12	NC	73	C/BE[1]	74	Gnd
13	NC	14	NC	75	AD[14]	76	AD[15]
15	GND	16	EX_INTC#	77	GND	78	AD[13]
17	INTB#	18	+5V	79	AD[12]	80	AD[11]
19	+3.3V	20	INTA#	81	AD[10]	82	GND
21	NC	22	NC	83	GND	84	AD[9]
23	GND	24	+3.3VS	85	AD[8]	86	C/BE[0]
25	CLK	26	RESET#	87	AD[7]	88	+3.3V
27	GND	28	+3.3V	89	+3.3V	90	AD[6]
29	REQ#	30	GNT#	91	AD[5]	92	AD[4]
31	+3.3V	32	GND	93	EX_GNT#	94	AD[2]
33	AD[31]	34	PME#	95	AD[3]	96	AD[0]
35	AD[29]	36	NC	97	+5V	98	NC
37	GND	38	AD[30]	99	AD[1]	100	NC
39	AD[27]	40	+3.3V	101	GND	102	GND
41	AD[25]	42	AD[28]	103	AC_SYNC	104	GND
43	EX_IDSEL#	44	AD[26]	105	AC_SDIN	106	AC_SDOUT
45	C/BE[3]	46	AD[24]	107	AC_BITCLK	108	NC
47	AD[23]	48	IDSEL#	109	NC	110	AC_RST#
49	GND	50	GND	111	NC	112	NC
51	AD[21]	52	AD[22]	113	GNC	114	GND
53	AD[19]	54	AD[20]	115	NC	116	NC
55	GND	56	PAR	117	GND	118	GND
57	AD[17]	58	AD[18]	119	GND	120	GND
59	C/BE[2]	60	AD[16]	121	NC	122	NC
61	IRDY#	62	GND	123	+5V	124	+3.3VS

J13: VGA CRT Connector

J13 is a 15-pin header for an external VGA CRT female connector.



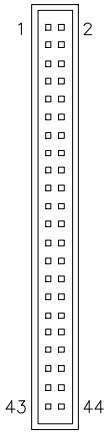
Signal Name	Pin	Pin	Signal Name
Red	1	2	Vcc
Green	3	4	Ground
Blue	5	6	N.C.
N.C.	7	8	N.C.
Ground	9	10	H-Sync
Ground	11	12	V-Sync
Ground	13	14	N.C.
Ground	15	16	N.C.

J14: For Testing Use Only

J15: Reset Switch Pin Header

CN1: Compact Flash Socket

JP4: Primary IDE Connector



Signal Name	Pin #	Pin #	Signal Name
Reset IDE	1	2	Ground
Host data 7	3	4	Host data 8
Host data 6	5	6	Host data 9
Host data 5	7	8	Host data 10
Host data 4	9	10	Host data 11
Host data 3	11	12	Host data 12
Host data 2	13	14	Host data 13
Host data 1	15	16	Host data 14
Host data 0	17	18	Host data 15
Ground	19	20	Key
DRQ0	21	22	Ground
Host IOW	23	24	Ground
Host IOR	25	26	Ground
IOCHRDY	27	28	Host ALE
DACK0	29	30	Ground
IRQ14	31	32	No connect
Address 1	33	34	No connect
Address 0	35	36	Address 2
Chip select 0	37	38	Chip select 1
Activity	39	40	Ground
Vcc	41	42	Vcc
Ground	43	44	N.C.

Watchdog Timer Configuration

The function of the watchdog timer is used to control switch select between normal and bypass modes. It is defined at I/O port 0443H. To enable the watchdog timer and write I/O port 0443H. To disable the timer, write I/O port 0441H for the system to normal mode. The timer has a tolerance of 20% for its intervals.
The following describes how the timer should be programmed.

Enabling Watchdog (Bypass mode):
MOV AX, 000FH (Choose the values from 0)
MOV DX, 0443H
OUT DX, AX

Disabling Watchdog (Normal Mode):
MOV AX, 00FH (Any value is fine.)
MOV DX, 0441H
OUT DX, AX

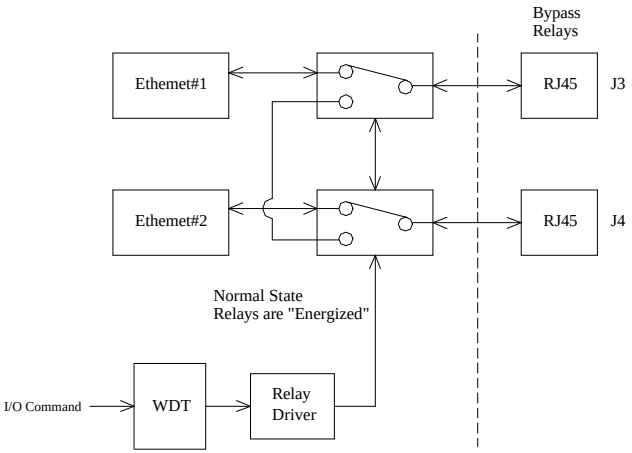
WATCHDOG TIMER CONTROL TABLE

Level	Value	Time/sec	Level	Value	Time/sec
1	1F	0	9	17	16
2	1E	2	10	16	18
3	1D	4	11	15	20
4	1C	6	12	14	22
5	1B	8	13	13	24
6	1A	10	14	12	26
7	19	12	15	11	28
8	18	14	16	10	30
Level	**Value**	**Time/sec**	**Level**	**Value**	**Time/sec**
17	0F	32	25	07	48
18	0E	34	26	06	50
19	0D	36	27	05	52
20	0C	38	28	04	54
21	0B	40	29	03	56
22	0A	42	30	02	58
23	09	44	31	01	60
24	08	46	32	00	62

Bypass and WDT

The bypass function on IB796 in used to link (or short) two independent Ethernet ports when user's application software halt or when power is off.

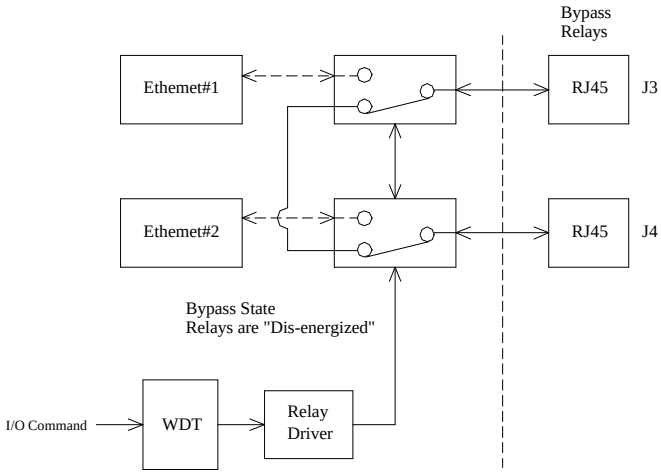
Block Diagram:



Communication States:

There are two communications states for the bypass function: (1) Normal State, (2) Bypass State. A watchdog timer (WDT) is used to control and switch the communication between the two states. A relay array is controlled by the WDT for physically routing of the two Ethernet ports.

The block diagram in the section above shows the Normal State, where the two Ethernet ports work independently. The following diagram shows the Bypass State, where the two Ethernet ports are bypassed together.



Status LED Programming

Programming the status LED can be done with the I/O port 404Dh bit7. When I/O port 404Dh bit 7 is set as 0 (low), then the LED is not active. When I/O port 404Dh bit 7 is set as 1 (high), then the LED is active.

Enable / Disable Bypass Mode

The I/O port 0442H can be defined to select between normal and bypass modes. The following describes the programming procedure.

Enabling Watchdog (Bypass mode):

```
MOV AX, 000F
MOV DX, 0442H
OUT DX, AX
```

Disabling Watchdog (Normal Mode):

```
MOV AX, 0010
MOV      DX, 0442H
OUT DX, AX
```

BIOS Setup

This chapter describes the different settings available in the Award BIOS that comes with the board. The topics covered in this chapter are as follows:

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Advanced Chipset Features..... 28
Integrated Peripherals..... 31
Power Management Setup 33
PNP/PCI Configurations..... 35
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Load Fail-Safe Defaults..... 38
Load Setup Defaults 38
Set Supervisor/User Password..... 38
Save & Exit Setup 38
Exit Without Saving 38

BIOS Introduction

The Award BIOS (Basic Input/Output System) installed in your computer system's ROM supports Intel Pentium II/III processors. The BIOS provides critical low-level support for a standard device such as disk drives, serial ports and parallel ports. It also adds virus and password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.

BIOS Setup

The Award BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the Award BIOS is immediately activated. Pressing the <Del> key immediately allows you to enter the Setup utility. If you are a little bit late pressing the <Del> key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup. If you still wish to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system Off and back On again. The following message will appear on the screen:

```
Press <DEL> to Enter Setup
```

In general, you press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help and <Esc> to quit.

When you enter the Setup utility, the Main Menu screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

CMOS Setup Utility – Copyright © 1984-2000 Award Software

Standard CMOS Features	Frequency/Voltage Control
Advanced BIOS Features	Load Fail-Safe Defaults
Advanced Chipset Features	Load Optimized Defaults
Integrated Peripherals	Set Supervisor Password
Power Management Setup	Set User Password
PnP/PCI Configurations	Save & Exit Setup
PC Health Status	Exit Without Saving
ESC : Quit	↑ ↓ → ← : Select Item
F10 : Save & Exit Setup	
Time, Date, Hard Disk Type…	

The section below the setup items of the Main Menu displays the control keys for this menu. At the bottom of the Main Menu just below the control keys section, there is another section which displays information on the currently highlighted item in the list.

***Note**: If the system cannot boot after making and saving system changes with Setup, the Award BIOS supports an override to the CMOS settings that resets your system to its default.*

***Warning:** It is strongly recommended that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both Award and your system manufacturer to provide the absolute maximum performance and reliability. Changing the defaults could cause the system to become unstable and crash in some cases.*

Standard CMOS Setup

"Standard CMOS Setup" choice allows you to record some basic hardware configurations in your computer system and set the system clock and error handling. If the board is already installed in a working system, you will not need to select this option. You will need to run the Standard CMOS option, however, if you change your system hardware configurations, the onboard battery fails, or the configuration stored in the CMOS memory was lost or damaged.

CMOS Setup Utility – Copyright © 1984-2000 Award Software
Standard CMOS Features

Date (mm:dd:yy)	Tue, Mar 26 2000	Item Help
Time (hh:mm:ss)	00 : 00 : 00	Menu Level
IDE Primary Master	Press Enter 13020 MB	Change the day, month,
IDE Primary Slave	Press Enter None	Year and century
Drive A	1.44M, 3.5 in.	
Drive B	None	
Video	EGA/VGA	
Halt On	All Errors	
Base Memory	640K	
Extended Memory	129024K	
Total Memory	130048K	

At the bottom of the menu are the control keys for use on this menu. If you need any help in each item field, you can press the <F1> key. It will display the relevant information to help you. The memory display at the lower right-hand side of the menu is read-only. It will adjust automatically according to the memory changed. The following describes each item of this menu.

Date

The date format is:

Day : **Sun to Sat**
Month : **1 to 12**
Date : **1 to 31**
Year : **1994 to 2079**

To set the date, highlight the "Date" field and use the PageUp/ PageDown or +/- keys to set the current time.

Time

The time format is: **Hour : 00 to 23**
Minute : 00 to 59
Second : 00 to 59

To set the time, highlight the "Time" field and use the <PgUp>/ <PgDn> or +/- keys to set the current time.

IDE Primary HDDs

The onboard PCI IDE connectors provide Primary channels for connecting up to four IDE hard disks or other IDE devices. Each channel can support up to two hard disks; the first is the "Master" and the second is the "Slave".

Press <Enter> to configure the hard disk. The selections include Auto, Manual, and None. Select 'Manual' to define the drive information manually. You will be asked to enter the following items.

CYLS :	Number of cylinders
HEAD :	Number of read/write heads
PRECOMP :	Write precompensation
LANDZ :	Landing zone
SECTOR :	Number of sectors

The Access Mode selections are as follows:

Auto	
Normal	(HD < 528MB)
Large	(for MS-DOS only)
LBA	(HD > 528MB and supports Logical Block Addressing)

Drive A / Drive B

These fields identify the types of floppy disk drive A or drive B that has been installed in the computer. The available specifications are:

360KB	1.2MB	720KB	1.44MB	2.88MB
5.25 in.	5.25 in.	3.5 in.	3.5 in.	3.5 in.

Video

This field selects the type of video display card installed in your system. You can choose the following video display cards:

EGA/VGA	For EGA, VGA, SEGA, SVGA or PGA monitor adapters. (default)
CGA 40	Power up in 40 column mode.
CGA 80	Power up in 80 column mode.
MONO	For Hercules or MDA adapters.

Halt On

This field determines whether or not the system will halt if an error is detected during power up.

No errors	The system boot will not be halted for any error that may be detected.
All errors	Whenever the BIOS detects a non-fatal error, the system will stop and you will be prompted.
All, But Keyboard	The system boot will not be halted for a keyboard error; it will stop for all other errors
All, But Diskette	The system boot will not be halted for a disk error; it will stop for all other errors.
All, But Disk/Key	The system boot will not be halted for a keyboard or disk error; it will stop for all others.

Advanced BIOS Features

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.

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Advanced BIOS Features

Virus Warning	**Disabled**	ITEM HELP
CPU Internal Cache	Enabled	Menu Level
External Cache	Enabled	
CPU L2 Cache ECC Checking	Enabled	Allows you choose the VIRUS warning feature for IDE Hard Disk boot sector protection. If this function is enabled and someone attempt to write data into this area, BIOS will show a warning message on screen and alarm beep
Processor Number Feature	Enabled	
Quick Power On Self Test	Enabled	
First Boot Device	Floppy	
Second Boot Device	HDD-0	
Third Boot Device	CDROM	
Boot Other Device	Enabled	
Swap Floppy Drive	Disabled	
Boot Up Floppy Seek	Disabled	
Boot Up Numlock Status	On	
Gate A20 Option	Normal	
Typematic Rate Setting	Disabled	
Typematic Rate (chars/Sec)	6	
Typematic Delay (Msec)	250	
Security Option	Setup	
OS Select For DRAM>64MB	Non-OS2	
Video BIOS Shadow	Enabled	
C8000-CBFFF Shadow	Disabled	
CC000-CFFFF Shadow	Disabled	
D0000-D3FFF Shadow	Disabled	
D4000-D7FFF Shadow	Disabled	
D8000-DBFFF Shadow	Disabled	
DC000-DFFF Shadow	Disabled	
Small Logo (EPA) Show	Enabled	

Virus Warning

This item protects the boot sector and partition table of your hard disk against accidental modifications. If an attempt is made, the BIOS will halt the system and display a warning message. If this occurs, you can either allow the operation to continue or run an anti-virus program to locate and remove the problem.

CPU Internal Cache / External Cache

Cache memory is additional memory that is much faster than conventional DRAM (system memory). CPUs from 486-type on up contain internal cache memory, and most, but not all, modern PCs have additional (external) cache memory. When the CPU requests data, the system transfers the requested data from the main DRAM into cache memory, for even faster access by the CPU. These items allow you to enable (speed up memory access) or disable the cache function. By default, these items are ***Enabled***.

CPU L2 Cache ECC Checking
This field enables or disables the ECC (Error Correction Checking) checking of the CPU level-2 cache. The default setting is ***Enabled***.

Processor Number Feature
When enabled, this feature allows external systems to detect the processor number/type of the CPU.

Quick Power On Self Test
When enabled, this field speeds up the Power On Self Test (POST) after the system is turned on. If it is set to *Enabled*, BIOS will skip some items.

First/Second/Third Boot Device
These fields determine the drive that the system searches first for an operating system. The options available include *Floppy*, *LS/ZIP*, *HDD-0*, *SCSI*, *CDROM*, *HDD-1*, *HDD-2*, *HDD-3*, *LAN* and *Disable*.

Boot Other Device
These fields allow the system to search for an operating system from other devices other than the ones selected in the First/Second/Third Boot Device.

Swap Floppy Drive
This item allows you to determine whether or not to enable Swap Floppy Drive. When enabled, the BIOS swaps floppy drive assignments so that Drive A becomes Drive B, and Drive B becomes Drive A. By default, this field is set to ***Disabled.***

Boot Up Floppy Seek
When enabled, the BIOS will seek whether or not the floppy drive installed has 40 or 80 tracks. 360K type has 40 tracks while 760K, 1.2M and 1.44M all have 80 tracks.

Boot Up NumLock Status
This allows you to activate the NumLock function after you power up the system.

Gate A20 Option
This field allows you to select how Gate A20 is worked. Gate A20 is a device used to address memory above 1 MB.

Typematic Rate Setting

When disabled, continually holding down a key on your keyboard will generate only one instance. When enabled, you can set the two typematic controls listed next. By default, this field is set to ***Disabled.***

Typematic Rate (Chars/Sec)

When the typematic rate is enabled, the system registers repeated keystrokes speeds. Settings are from 6 to 30 characters per second.

Typematic Delay (Msec)

When the typematic rate is enabled, this item allows you to set the time interval for displaying the first and second characters. By default, this item is set to ***250msec.***

Security Option

This field allows you to limit access to the System and Setup. The default value is ***Setup***. When you select *System,* the system prompts for the User Password every time you boot up. When you select *Setup,* the system always boots up and prompts for the Supervisor Password only when the Setup utility is called up.

OS Select for DRAM > 64MB

This option allows the system to access greater than 64MB of DRAM memory when used with OS/2 that depends on certain BIOS calls to access memory. The default setting is ***Non-OS/2***.

Video BIOS Shadow

This item allows you to change the Video BIOS location from ROM to RAM. Video Shadow will increase the video speed.

C8000 - CBFFF Shadow/DC000 - DFFFF Shadow

Shadowing a ROM reduces the memory available between 640KB to 1024KB. These fields determine whether or not optional ROM will be copied to RAM.

Small Logo (EPA) Show

This field enables the showing of the EPA logo located at the upper right of the screen during boot up.

Advanced Chipset Features

This Setup menu controls the configuration of the chipset.

CMOS Setup Utility – Copyright © 1984-2000 Award Software
Advanced Chipset Features

P2C/C2P Concurrency	Enabled	ITEM HELP
Fast R-W Turn Around	Enabled	Menu Level
System BIOS Cacheable	Disabled	
Video BIOS Cacheable	Disabled	
Frame Buffer Size	2M	
AGP Aperture Size	64M	
OnChip USB	Enabled	
USB Keyboard Support	Disabled	
CPU to PCI Write Buffer	Enabled	
PCI Dynamic Bursting	Enabled	
PCI Master 0 WS Write	Enabled	
PCI Delay Transaction	Enabled	
PCI#2 Access #1 Retry	Disabled	
AGP Master 1 WS Write	Disabled	
AGP Master 1 WS Read	Disabled	

P2C / C2P Concurrency

Set to Disabled for best performance. You may set this to Enabled if you want any sort of system stability.

Fast R-W Turn Around

Leave it as Enabled for 'faster' performance.

System BIOS Cacheable

The setting of *Enabled* allows caching of the system BIOS ROM at F000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

Video BIOS Cacheable

The Setting *Enabled* allows caching of the video BIOS ROM at C0000h-F7FFFh, resulting in better video performance. However, if any program writes to this memory area, a system error may result.

Frame Buffer Size

The default setting of the frame buffer size is 2M.

AGP Aperture Size

The field sets aperture size of the graphics. The aperture is a portion of the PCI memory address range dedicated for graphics memory address space. Host cycles that hit the aperture range are forwarded to the AGP without any translation. The default setting is ***64M***.

OnChip USB

The default setting of this filed is Enabled to enable the USB function on board.

OnChip Keyboard Support

Enable this if you are using a USB keyboard.

CPU to PCI Write Buffer

This controls the CPU write buffer to the PCI bus. If this buffer is disabled, the CPU writes directly to the PCI bus. The default setting is ***Enabled***.

PCI Dynamic Bursting

This option controls the PCI write buffer. If this is enabled, then every write transaction on the PCI bus goes straight to the write buffer. Burst transactions are then sent on their way as soon as there are enough to send in a single burst.

PCI Master 0 WS Write

This function determines whether there's a delay before any writes to the PCI bus. If this is enabled, then writes to the PCI bus are executed immediately (with zero wait states), as soon as the PCI bus is ready to receive data. But if it is disabled, then every write transaction to the PCI bus is delayed by one wait state. It's recommended to enable this for faster PCI performance.

PCI Delay Transaction

This feature is used to meet the latency of PCI cycles to and from the ISA bus.

PCI#2 Access #1 Retry

This BIOS feature is linked to the CPU to PCI Write Buffer. Normally, the CPU to PCI Write Buffer is enabled. All writes to the PCI bus are, as such, immediately written into the buffer, instead of the PCI bus. This frees up the CPU from waiting till the PCI bus is free. The data are then written to the PCI bus when the next PCI bus cycle starts.

There's a possibility that the buffer write to the PCI bus may fail. When that happens, this BIOS option determines if the buffer write should be reattempted or sent back for arbitration. If this BIOS option is enabled, then the buffer will attempt to write to the PCI bus until successful. If disabled, the buffer will flush its contents and register the transaction as failed. The CPU will have to write again to the write buffer.

AGP Master 1 WS Write/Read

When enabled a single wait state is used when writing/reading to the AGP bus. When disabled a 2 wait state is used. For optimal performance set this to Enabled. For improved stability set it to disabled.

Integrated Peripherals

This section sets configurations for your hard disk and other integrated peripherals.

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Integrated Peripherals

On-Chip IDE Channel 0	Enabled	ITEM HELP
IDE Prefetch Mode	Enabled	Menu Level
IDE Primary Master PIO	Auto	
IDE Primary Slave PIO	Auto	
IDE Primary Master UDMA	Auto	
IDE Primary Slave UDMA	Auto	
Init Display First	PCI Slot	
IDE HDD Block Mode	Disabled	
Onboard FDD Controller	Enabled	
Onboard Serial Port 1	3F8/IRQ4	
Onboard Serial Port 2	Disabled	
Onboard Parallel Port	378/IRQ7	
Onboard Parallel Mode	Normal	
ECP Mode Use DMA	3	
Parallel Port EPP Type	EPP1.9	

OnChip IDE Channel 0

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select *Enabled* to activate each channel separately.

IDE Prefetch Mode

These field enables/disables the prefetch buffers in the PCI IDE controller. The prefetch buffers are used as a temporary storage place as data is transferred from one location to another.

IDE Primary Master/Slave PIO

These fields allow your system hard disk controller to work faster. Rather than have the BIOS issue a series of commands that transfer to or from the disk drive, PIO (Programmed Input/Output) allows the BIOS to communicate with the controller and CPU directly.

The system supports five modes, numbered from 0 (default) to 4, which primarily differ in timing. When Auto is selected, the BIOS will select the best available mode.

IDE Primary/ Master/Slave UDMA

These fields allow your system to improve disk I/O throughput to 33Mb/sec with the Ultra DMA/33 feature. The options are *Auto* and *Disabled*.

Init Display First

This field allows the system to initialize first the VGA card on chip or the display on the PCI Slot. By default, the *PCI Slot* VGA is initialized first.

IDE HDD Block Mode

This field allows your hard disk controller to use the fast block mode to transfer data to and from your hard disk drive.

Onboard FDD Controller

Select *Enabled* if your system has a floppy disk controller installed on the board and you wish to use it. If you install an add-in FDC or the system has no floppy drive, select Disabled in this field. This option allows you to select the onboard FDD port.

Onboard Serial/Parallel Port

These fields allow you to select the onboard serial and parallel ports and their addresses. The default values for these ports are:

Serial Port 1	3F8/IRQ4
Serial Port 2	Disabled
Parallel Port	378/IRQ7

Parallel Port Mode

This field allows you to determine parallel port mode function.

SPP	Standard Printer Port
EPP	Enhanced Parallel Port
ECP	Extended Capabilities Port

ECP Mode Use DMA

This field, by default, is set to 3.

Parallel Port EPP Type

This field, by default, is set to EPP 1.9.

Power Management Setup

The Power Management Setup allows you to save energy of your system effectively.

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Power Management Setup

Power Management	Press Enter	ITEM HELP
PM Control by APM	Yes	Menu Level
Video Off Option	Suspend ->Off	
Video Off Method	VH Sync + Blank	
Modem Use IRQ	3	
Wake Up Events	Press Enter	

Power Management

This field allows you to select the type of power saving management modes. There are four selections for Power Management.

Min. Power Saving	Minimum power management
Max. Power Saving	Maximum power management.
User Define	Each of the ranges is from 1 min. to 1hr. Except for HDD Power Down which ranges from 1 min. to 15 min. (Default)

Under this option, you can also configure other features such HDD Power Down, Doze Mode and Suspend Mode.

PM Control by APM

If Advanced Power Management (APM) is installed on your system, selecting Yes gives better power savings.

Video Off Option

This option decides when to shutdown video for power saving. You can select it as always on or turn off video when system enters suspend mode.

Video Off Method

This field defines the Video Off features. There are three options.

V/H SYNC + Blank	Default setting, blank the screen and turn off vertical and horizontal scanning.
DPMS	Allows the BIOS to control the video display card if it supports the DPMS feature.
Blank Screen	This option only writes blanks to the video buffer.

Modem Use IRQ

This field sets the IRQ used by the Modem. By default, the setting is ***3***.

Wake Up Events

The HDD, FDD, COM, LPT Ports, and PCI PIRQ are I/O events which can prevent the system from entering a power saving mode or can awaken the system from such a mode. When an I/O device wants to gain the attention of the operating system, it signals this by causing an IRQ to occur. When the operating system is ready to respond to the request, it interrupts itself and performs the service.

PNP/PCI Configurations

This option configures the PCI bus system. All PCI bus systems on the system use INT#, thus all installed PCI cards must be set to this value.

CMOS Setup Utility – Copyright © 1984-2000 Award Software
PnP/PCI Configurations

		ITEM HELP
PNP OS Installed	No	Menu Level
Reset Configuration Data	Disabled	Default is Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the OS cannot boot
Resources Controlled By	Manual	
IRQ Resources	Press Enter	
DMA Resources	Press Enter	
PCI/VGA Palette Snoop	Disabled	
Assign IRQ for VGA	Disabled	
Assign IRQ for USB	Enabled	

PNP OS Installed

Select ***Yes*** if the system operating environment is Plug-and-Play aware (e.g., Windows 95). The options: Yes and No.

Reset Configuration Data

Normally, you leave this field Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the operating system cannot boot. The options: Enabled and Disabled.

Resources Controlled by

This PnP BIOS configures all of the boot and compatible devices with the use of a use a PnP operating system such as Windows 95.

IRQ / DMA Resources

These fields allow you to configure the IRQ / DMA Resources.

PCI/VGA Palette Snoop

Some non-standard VGA display cards may not show colors properly. This field allows you to set whether or not MPEG ISA/VESA VGA cards can work with PCI/VGA. When this field is enabled, a PCI/VGA can work with an MPEG ISA/VESA VGA card. When this field is disabled, a PCI/VGA cannot work with an MPEG ISA/VESA card.

Assign IRQ for VGA

When this option is enabled system will assign an IRQ for VGA. The default is Enabled. This can also be Disabled so that VGA will not occupy an IRQ, thus releasing it free for other usage (typically LAN card etc).

Assign IRQ for USB

When this option is enabled system will assign an IRQ for USB. The default is ***Enabled***. This can also be Disabled so that USB will not occupy an IRQ, thus releasing it free for other usage (typically LAN card etc).

PC Health Status

This section shows the parameters in determining the PC Health Status. These parameters include temperatures, fan speeds and voltages.

CMOS Setup Utility – Copyright © 1984-2000 Award Software
PC Health Status

		ITEM HELP
CPU Warning Temperature	75°C/167°F	
CPU Temp.	41°C / 87°F	
System Temp.	29°C / 84°F	
Vcore	1.70V	
2.5V	2.52V	
3.3V	3.42V	
5V	5.02V	
12V	11.94V	

CPU Warning Temperature

This field sets the temperature threshold that, when reached, the system would give an audible warning.

Shutdown Temperature

This field allows the user to set the temperature by which the system automatically shuts down once the threshold temperature is reached. This function can help prevent damage to the system that is caused by overheating.

Temperatures/Fan Speeds/Voltages

These fields are the parameters of the hardware monitoring function feature of the board. The values are read-only values as monitored by the system and show the PC health status.

Load Fail-Safe Defaults

This option allows you to load the troubleshooting default values permanently stored in the BIOS ROM. These default settings are non-optimal and disable all high-performance features.

Load Setup Defaults

This option allows you to load the default values to your system configuration. These default settings are optimal and enable all high performance features.

Set Supervisor/User Password

These two options set the system password. Supervisor Password sets a password that will be used to protect the system and Setup utility. User Password sets a password that will be used exclusively on the system. To specify a password, highlight the type you want and press <Enter>. The Enter Password: message prompts on the screen. Type the password, up to eight characters in length, and press <Enter>. The system confirms your password by asking you to type it again. After setting a password, the screen automatically returns to the main screen.

To disable a password, just press the <Enter> key when you are prompted to enter the password. A message will confirm the password to be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

Save & Exit Setup

This option allows you to determine whether or not to accept the modifications. If you type "Y", you will quit the setup utility and save all changes into the CMOS memory. If you type "N", you will return to Setup utility.

Exit Without Saving

Select this option to exit the Setup utility without saving the changes you have made in this session. Typing "Y" will quit the Setup utility without saving the modifications. Typing "N" will return you to Setup utility.

Drivers Installation

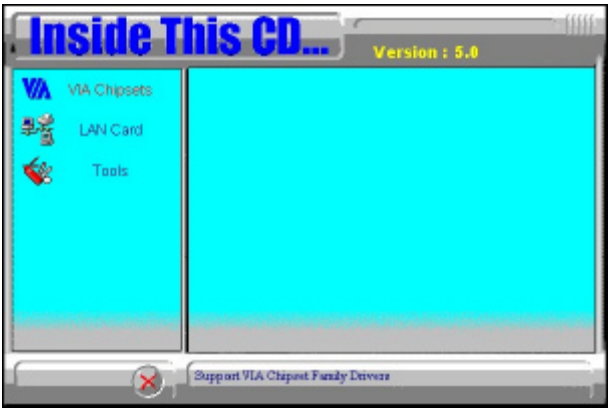
This section describes the installation procedures for software and drivers under the Windows 98, Windows NT 4.0 and Windows 2000. The software and drivers are included with the board. If you find the items missing, please contact the vendor where you made the purchase. The contents of this section include the following:

VIA 4 in 1 Drivers Installation 40
VGA Drivers Installation..... 45
LAN Drivers Installation 47

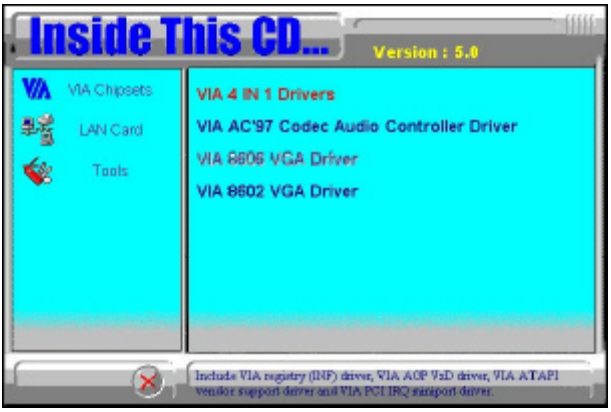
VIA 4 in 1 Drivers Installation

Before installing the drivers for VGA, LAN and Audio, install the VIA 4 in 1 drivers first. Follow the instructions below to complete the installation.

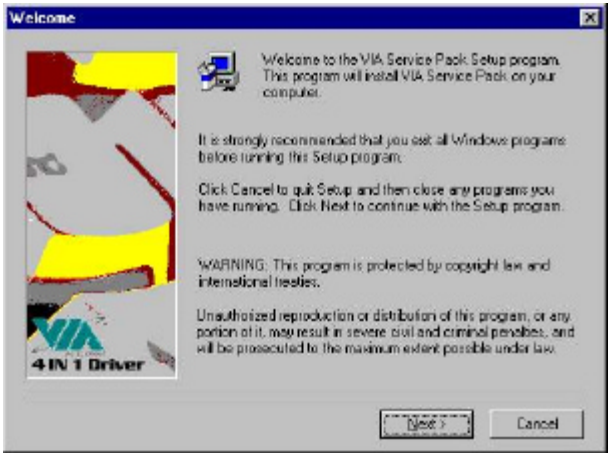
1. Insert the CD that comes with the board and the screen below would appear. Click VIA Chipsets on the left side.



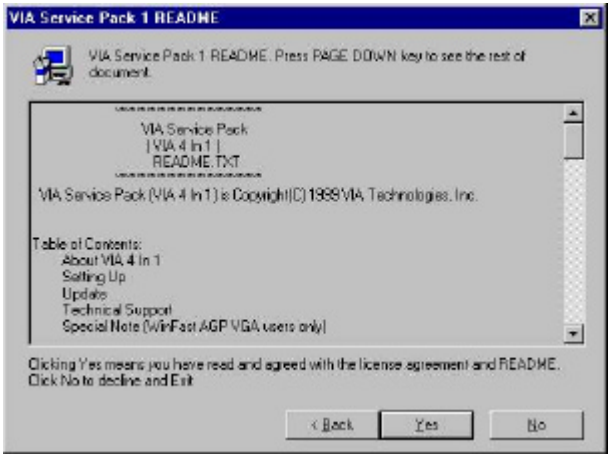
2. Click VIA 4 IN 1 Drivers.


Inside This CD...
Version : 5.0
VIA Chipsets
LAN Card
Tools
VIA 4 IN 1 Drivers
VIA AC'97 Codec Audio Controller Driver
VIA 8606 VGA Driver
VIA 8602 VGA Driver
Include VIA registry (INF) driver, VIA AGP VxD driver, VIA ATAPI vendor support driver and VIA PCI IRQ miniport driver.

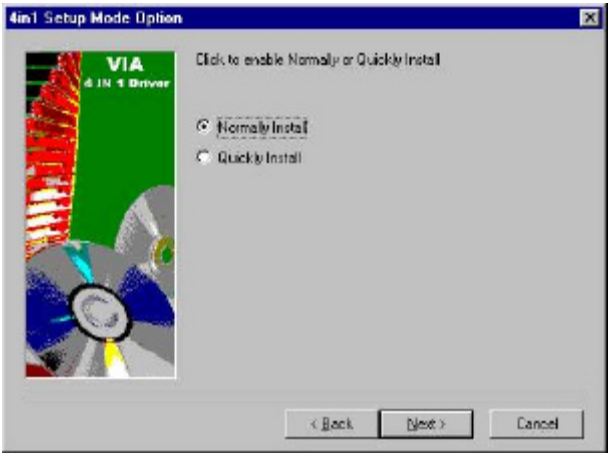
3. When the Welcome screen appears, click Next.


Welcome
Welcome to the VIA Service Pack Setup program. This program will install VIA Service Pack on your computer.
It is strongly recommended that you exit all Windows programs before running this Setup program.
Click Cancel to quit Setup and then close any programs you have running. Click Next to continue with the Setup program.
WARNING: This program is protected by copyright law and international treaties.
Unauthorized reproduction or distribution of this program, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under law.
4 IN 1 Driver
Next >
Cancel

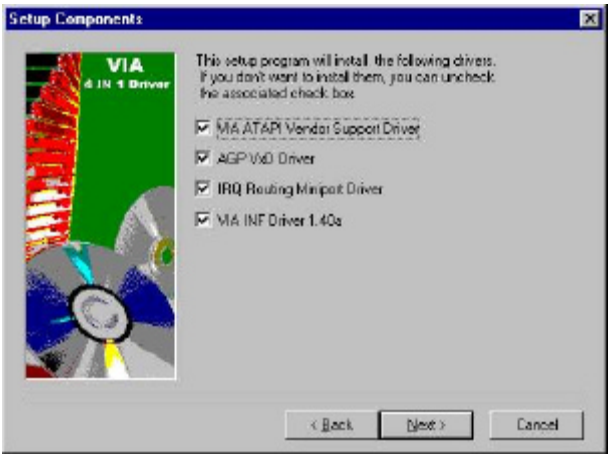
4. Click Next to agree with the license agreement statement and to continue.


VIA Service Pack 1 README
VIA Service Pack 1 README. Press PAGE DOWN key to see the rest of document.
VIA Service Pack
(VIA 4 In 1)
README.TXT
VIA Service Pack (VIA 4 In 1) is Copyright (C) 1999 VIA Technologies, Inc.
Table of Contents:
About VIA 4 In 1
Setting Up
Update
Technical Support
Special Note (WinFast AGP VGA users only)
Clicking Yes means you have read and agreed with the license agreement and README. Click No to decline and Exit
< Back
Yes
No

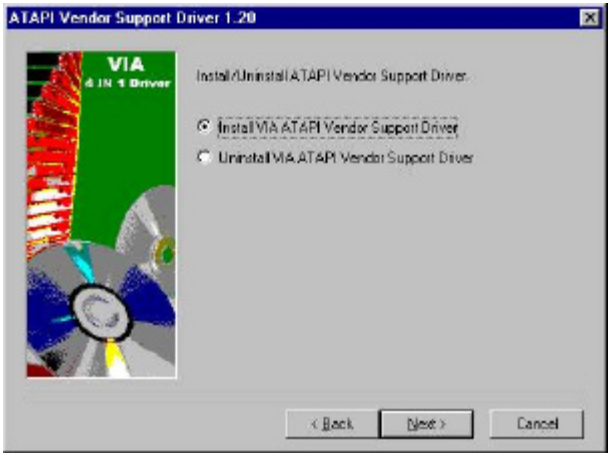
5. Select the Setup Mode and click Next to continue.



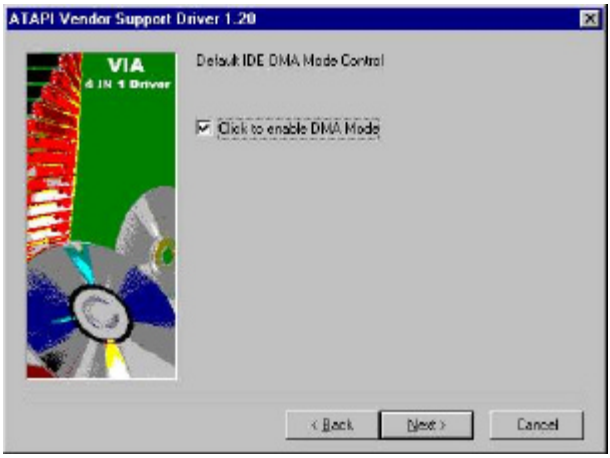
6. Click Next to install the drivers listed.


Setup Components
VIA
4 IN 1 Driver
This setup program will install the following drivers.
If you don't want to install them, you can uncheck
the associated check box.
VIA ATAPI Vendor Support Driver
AGP VxD Driver
IRQ Routing Miniport Driver
VIA INF Driver 1.40a
< Back
Next >
Cancel

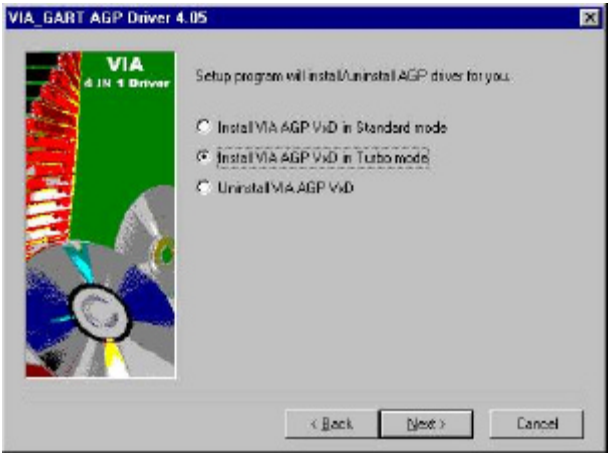
7. Click Next to install the VIA ATAPI Vendor Support Driver.


ATAPI Vendor Support Driver 1.20
VIA
4 IN 1 Driver
Install/Uninstall ATAPI Vendor Support Driver
Install VIA ATAPI Vendor Support Driver
Uninstall VIA ATAPI Vendor Support Driver
< Back
Next >
Cancel

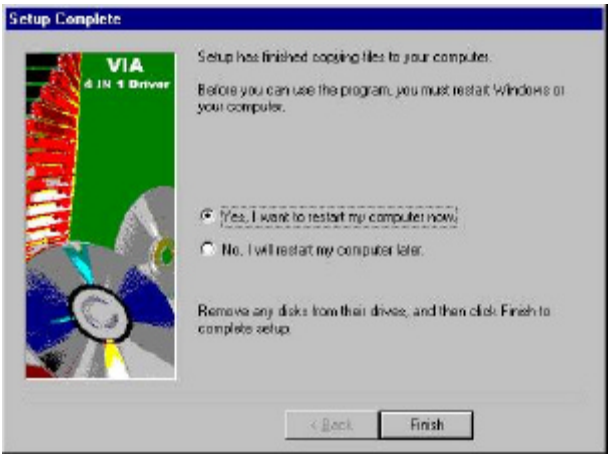
8. Click Next to enable DMA Mode.



9. Click Next to install the VIA AGP VxD in Turbo mode.


VIA_GART AGP Driver 4.05
VIA
4 IN 1 Driver
Setup program will install/uninstall AGP driver for you.
Install VIA AGP VxD in Standard mode
Install VIA AGP VxD in Turbo mode
Uninstall VIA AGP VxD
< Back
Next >
Cancel

10. Click Finish to restart the computer and for changes to take effect.

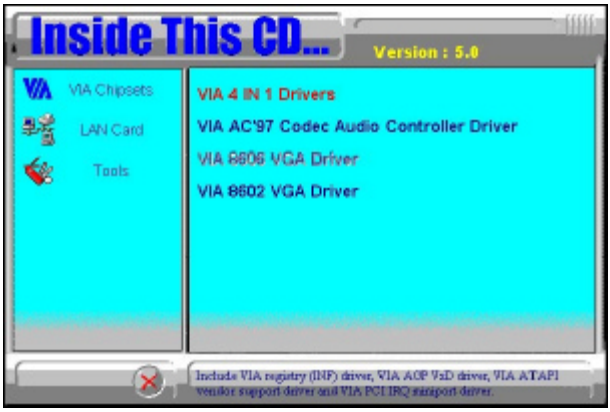

Setup Complete
VIA
4 IN 1 Driver
Setup has finished copying files to your computer.
Before you can use the program, you must restart Windows or your computer.
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish to complete setup.
< Back
Finish

VGA Drivers Installation

After installing the VIA 4 in 1 drivers, you may now install the VIA 8602 VGA Driver. Follow the steps below to proceed with the installation.

NOTE: Before installing the VGA drivers on Windows NT 4.0, you need to install Service Pack 3 or above.

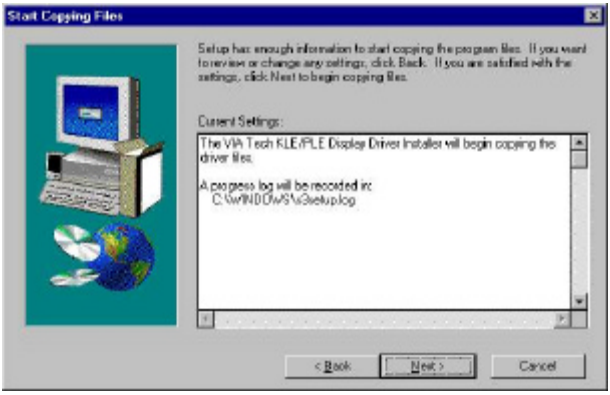
1. Insert the CD that comes with the board. Click on VIA Chipsets on the left and then click VIA 8602 VGA Driver.


Inside This CD...
Version : 5.0
VIA Chipsets
LAN Card
Tools
VIA 4 IN 1 Drivers
VIA AC'97 Codec Audio Controller Driver
VIA 8606 VGA Driver
VIA 8602 VGA Driver
Includes VIA registry (INF) driver, VIA AGP VxD driver, VIA ATAPI vendor support driver and VIA PCI IRQ miniport driver.

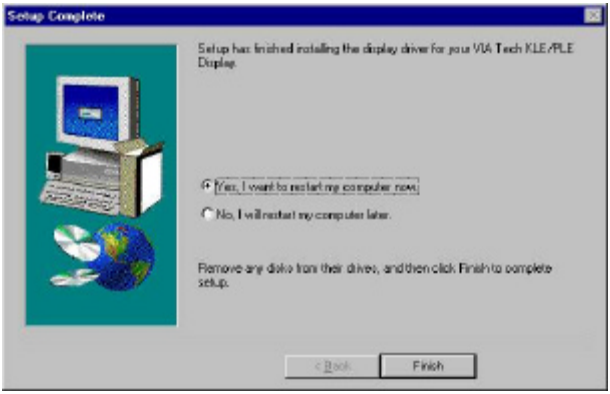
2. Click Next to agree with the license agreement statement and to continue.

Welcome
Welcome to the VIA Tech KLE/PLE Display Driver Setup program. This program will install VIA Tech KLE/PLE Display Driver on your computer.
It is strongly recommended that you exit all Windows programs before running this Setup program.
Click Cancel to quit Setup and then close any programs you have running. Click Next to continue with the Setup program.
WARNING: This program is protected by copyright law and international treaties.
Unauthorized reproduction or distribution of this program, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under law.
Next >
Cancel

3. Click Next to start copying the driver files.


Start Copying Files
Setup has enough information to start copying the program files. If you want to review or change any settings, click Back. If you are satisfied with the settings, click Next to begin copying files.
Current Settings:
The VIA Tech K8E/P8E Display Driver Installer will begin copying the driver files.
A progress log will be recorded in:
C:\WINDOWS\Setup.log
< Back
Next >
Cancel

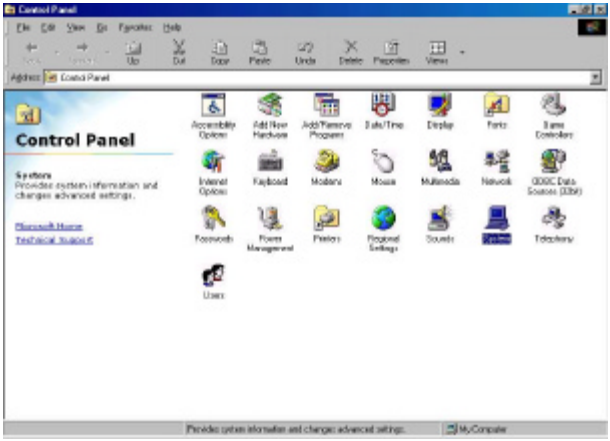
4. Click Finish to restart the computer and for changes to take effect.

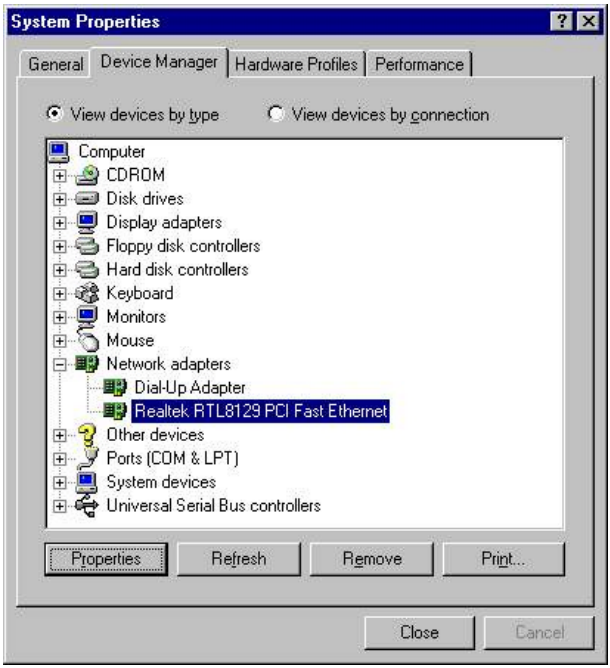

Setup Complete
Setup has finished installing the display driver for your VIA Tech K8E/P8E Display.
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish to complete setup.
< Back
Finish

LAN Drivers Installation

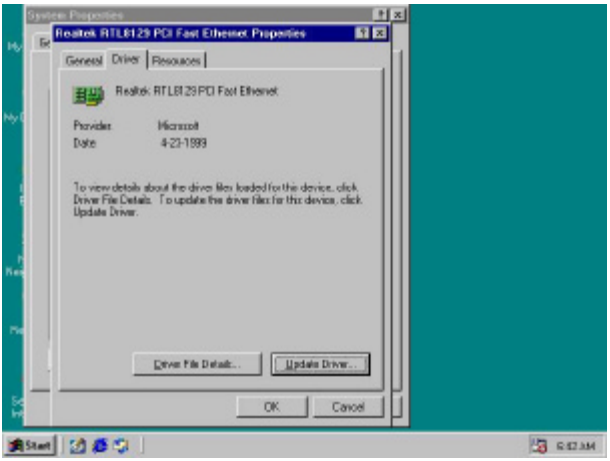
Follow the steps below to proceed with the LAN drivers installation.

1. In your Windows operating system, click Start → Settings → Control Panel → System Properties.

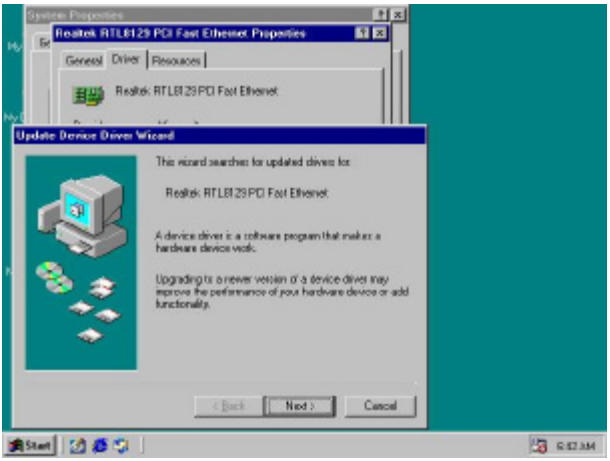




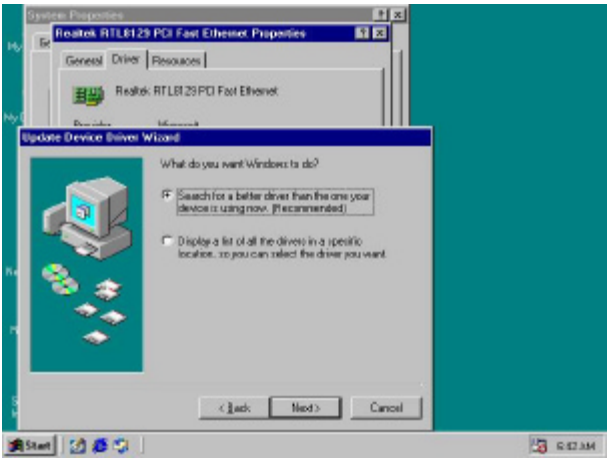
2. Under System Properties, click on the Device Manager tab. Double click on Realtek 8129 PCI Fast Ethernet. Click the Driver tab as shown. Now click the Update Driver button.



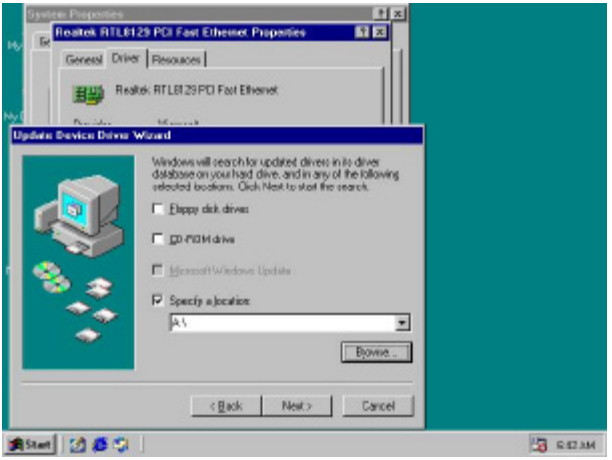
3. When the Update Device Drivers Wizard appears, click Next to continue.


Realtek RTL8129 PCI Fast Ethernet Properties
General
Driver
Resources
Realtek RTL8129 PCI Fast Ethernet
Update Device Driver Wizard
This wizard searches for updated drivers for:
Realtek RTL8129 PCI Fast Ethernet
A device driver is a software program that makes a hardware device work.
Upgrading to a newer version of a device driver may improve the performance of your hardware device or add functionality.
< Back
Next >
Cancel
Start

4. Click Next to “Search for a better driver than the one your device is using now. (Recommended”.


Realtek RTL8129 PCI Fast Ethernet Properties
General
Driver
Resources
Realtek RTL8129 PCI Fast Ethernet
Update Device Driver Wizard
What do you want Windows to do?
Search for a better driver than the one your device is using now. (Recommended)
Display a list of all the drivers in a specific location, so you can select the driver you want
< Back
Next >
Cancel
Start

5. Click “Specify a location” and click Next to continue.


Realtek RTL8129 PCI Fast Ethernet Properties
General
Driver
Resources
Realtek RTL8129 PCI Fast Ethernet
Update Device Driver Wizard
Windows will search for updated drivers in its driver database on your hard drive, and in any of the following selected locations. Click Next to start the search.
Floppy disk drives
CD-ROM drive
Microsoft Windows Update
Specify a location:
A:\
Browse...
< Back
Next >
Cancel
Start

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Appendix

A. I/O Port Address Map
B. Interrupt Request Lines (IRQ)

A. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses, which also becomes the identity of the device. The following table lists the I/O port addresses used.

Address	Device Description
000h - 01Fh	DMA Controller #1
020h - 03Fh	Interrupt Controller #1
040h - 05Fh	Timer
060h - 06Fh	Keyboard Controller
070h - 07Fh	Real Time Clock, NMI
080h - 09Fh	DMA Page Register
0A0h - 0BFh	Interrupt Controller #2
0C0h - 0DFh	DMA Controller #2
0F0h	Clear Math Coprocessor Busy Signal
0F1h	Reset Math Coprocessor
1F0h - 1F7h	IDE Interface
278 - 27F	Parallel Port #2(LPT2)
2F8h - 2FFh	Serial Port #2(COM2)
2B0 - 2DF	Graphics adapter Controller
378h - 3FFh	Parallel Port #1(LPT1)
360 - 36F	Network Ports
3B0 - 3BF	Monochrome & Printer adapter
3C0 - 3CF	EGA adapter
3D0 - 3DF	CGA adapter
3F0h - 3F7h	Floppy Disk Controller
3F8h - 3FFh	Serial Port #1(COM1)

B. Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

Level	Function
IRQ0	System Timer Output
IRQ1	Keyboard
IRQ2	Interrupt Cascade
IRQ3	Serial Port #2
IRQ4	Serial Port #1
IRQ5	Reserved
IRQ6	Floppy Disk Controller
IRQ7	Parallel Port #1
IRQ8	Real Time Clock
IRQ9	Reserved
IRQ10	Reserved
IRQ11	Reserved
IRQ12	PS/2 Mouse
IRQ13	80287
IRQ14	Primary IDE
IRQ15	Secondary IDE